SVM Classifier

Exp no.: 12

Aim: SVM Classifier

In [ ]:
```
# Name: Pragati Pramod Bindod
# Roll no. : 15
# Section : A
```

In [2]:
```
import pandas as pd
import os
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
from sklearn.model_selection import train_test_split
import warnings
warnings.filterwarnings('ignore')
```

In [3]:
```
os.getcwd()
```

Out[3]:
```
'C:\\Users\\hp\\Downloads'
```

In [4]:
```
os.chdir('C:\\Users\\HP\\Desktop')
```

In [5]:
```
df=pd.read_csv('framingham.csv')
```

In [6]:
```
df.head()
```

Out[6]:

	male	age	education	currentSmoker	cigsPerDay	BPMeds	prevalentStroke	prevaler
0	1	39	4.0	0	0.0	0.0	0	
1	0	46	2.0	0	0.0	0.0	0	
2	1	48	1.0	1	20.0	0.0	0	
3	0	61	3.0	1	30.0	0.0	0	
4	0	46	3.0	1	23.0	0.0	0	

In [7]:
```
df.tail()
```

Out[7]:

	male	age	education	currentSmoker	cigsPerDay	BPMeds	prevalentStroke	prev
4233	1	50	1.0	1	1.0	0.0	0	
4234	1	51	3.0	1	43.0	0.0	0	
4235	0	48	2.0	1	20.0	NaN	0	
4236	0	44	1.0	1	15.0	0.0	0	
4237	0	52	2.0	0	0.0	0.0	0	

In [8]:
```
df.info
```

Out[8]:
```
<bound method DataFrame.info of       male  age  education  currentSmo
ker  cigsPerDay  BPMeds  \
0        1   39        4.0             0        0.0     0.0
1        0   46        2.0             0        0.0     0.0
2        1   48        1.0             1       20.0     0.0
3        0   61        3.0             1       30.0     0.0
4        0   46        3.0             1       23.0     0.0
...    ...  ...        ...           ...        ...     ...
4233     1   50        1.0             1        1.0     0.0
4234     1   51        3.0             1       43.0     0.0
4235     0   48        2.0             1       20.0     NaN
4236     0   44        1.0             1       15.0     0.0
4237     0   52        2.0             0        0.0     0.0

      prevalentStroke  prevalentHyp  diabetes  totChol  sysBP  diaBP
BMI  \
0                   0             0         0    195.0  106.0   70.0
26.97
1                   0             0         0    250.0  121.0   81.0
28.73
2                   0             0         0    245.0  127.5   80.0
25.34
3                   0             1         0    225.0  150.0   95.0
28.58
4                   0             0         0    285.0  130.0   84.0
23.10
...               ...           ...       ...      ...    ...    ...
...
4233                0             1         0    313.0  179.0   92.0
25.97
4234                0             0         0    207.0  126.5   80.0
19.71
4235                0             0         0    248.0  131.0   72.0
22.00
4236                0             0         0    210.0  126.5   87.0
19.16
4237                0             0         0    269.0  133.5   83.0
21.47

      heartRate  glucose  TenYearCHD
0          80.0     77.0           0
1          95.0     76.0           0
2          75.0     70.0           0
3          65.0    103.0           1
4          85.0     85.0           0
...         ...      ...         ...
4233       66.0     86.0           1
4234       65.0     68.0           0
4235       84.0     86.0           0
4236       86.0      NaN           0
4237       80.0    107.0           0

[4238 rows x 16 columns]>
```

In [9]:
```
df.describe()
```

Out[9]:

	male	age	education	currentSmoker	cigsPerDay	BPMeds
count	4238.000000	4238.000000	4133.000000	4238.000000	4209.000000	4185.000000
mean	0.429212	49.584946	1.978950	0.494101	9.003089	0.029630
std	0.495022	8.572160	1.019791	0.500024	11.920094	0.169584
min	0.000000	32.000000	1.000000	0.000000	0.000000	0.000000
25%	0.000000	42.000000	1.000000	0.000000	0.000000	0.000000
50%	0.000000	49.000000	2.000000	0.000000	0.000000	0.000000
75%	1.000000	56.000000	3.000000	1.000000	20.000000	0.000000
max	1.000000	70.000000	4.000000	1.000000	70.000000	1.000000

In [10]:
```
df.isna().sum()
```

Out[10]:
```
male               0
age                0
education        105
currentSmoker      0
cigsPerDay        29
BPMeds            53
prevalentStroke    0
prevalentHyp       0
diabetes           0
totChol           50
sysBP              0
diaBP              0
BMI               19
heartRate          1
glucose          388
TenYearCHD         0
dtype: int64
```

In [11]:
```
df['glucose'].fillna(value = df['glucose'].mean(),inplace=True)
```

In [12]:
```
df['education'].fillna(value = df['education'].mean(),inplace=True)
```

In [13]:
```
df['heartRate'].fillna(value = df['heartRate'].mean(),inplace=True)
```

In [14]:
```
df['BMI'].fillna(value = df['BMI'].mean(),inplace=True)
```

In [15]:
```
df['cigsPerDay'].fillna(value = df['cigsPerDay'].mean(),inplace=True)
```

In [16]:
```
df['totChol'].fillna(value = df['totChol'].mean(),inplace=True)
```

In [17]:
```
df['BPMeds'].fillna(value = df['BPMeds'].mean(),inplace=True)
```

In [18]:
```
df.isna().sum()
```

Out[18]:
```
male               0
age                0
education          0
currentSmoker      0
cigsPerDay         0
BPMeds             0
prevalentStroke    0
prevalentHyp       0
diabetes           0
totChol            0
sysBP              0
diaBP              0
BMI                0
heartRate          0
glucose            0
TenYearCHD         0
dtype: int64
```

In [19]:
```
df.isna().sum()
```

Out[19]:
```
male               0
age                0
education          0
currentSmoker      0
cigsPerDay         0
BPMeds             0
prevalentStroke    0
prevalentHyp       0
diabetes           0
totChol            0
sysBP              0
diaBP              0
BMI                0
heartRate          0
glucose            0
TenYearCHD         0
dtype: int64
```

In [20]:
```
#Splitting the dependent and independent variables.
x = df.drop("TenYearCHD",axis=1)
y = df['TenYearCHD']
```

In [21]:
```
x #checking the features
```

Out[21]:

	male	age	education	currentSmoker	cigsPerDay	BPMeds	prevalentStroke	prev
0	1	39	4.0	0	0.0	0.00000	0	
1	0	46	2.0	0	0.0	0.00000	0	
2	1	48	1.0	1	20.0	0.00000	0	
3	0	61	3.0	1	30.0	0.00000	0	
4	0	46	3.0	1	23.0	0.00000	0	
...	...	...	...	...	...	...	...	...
4233	1	50	1.0	1	1.0	0.00000	0	
4234	1	51	3.0	1	43.0	0.00000	0	
4235	0	48	2.0	1	20.0	0.02963	0	
4236	0	44	1.0	1	15.0	0.00000	0	
4237	0	52	2.0	0	0.0	0.00000	0	

4238 rows × 15 columns

Train Test Split

In [22]:
```
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.2,rand
```

In [23]:
```
y_train
```

Out[23]:
```
3252    0
3946    0
1261    0
2536    0
4089    0
       ..
3444    0
466     0
3092    0
3772    0
860     0
Name: TenYearCHD, Length: 3390, dtype: int64
```

SVM Classifier

In [24]:
```
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score
svc=SVC()
svc.fit(x_test,y_test)
acc = svc.score(x_test,y_test)*100
print(acc)
```

```
85.37735849056604
```